

ANNEX A

Methodology

Introduction

Various assumptions have been made in calculating gross and net in-work and out-of-work incomes on a comparable basis across countries. The first section of this annex explains the reference periods used in the calculations and for expressing results. Section 2 outlines the assumptions made in calculating benefit amounts. Section 3 looks at the tax treatment of benefit income and earnings, and Section 4 introduces the income concept of the average worker (AW) earnings on which calculations are based. The latter two sections are kept relatively brief since a more detailed discussion can be found in *Taxing Wages 2005-2006* (OECD, 2007). Section 5 outlines the treatment of regional differences in tax and benefit systems. Section 6 discusses how the various work incentive indicators used in this publication relate to each other. Section 7 describes the types of family situation considered in this publication.

1. Income definition and time-period issues

Only cash incomes are considered. Net incomes are gross earnings (see Section 2) plus cash benefits (Section 3) minus income taxes and own social security contributions (Section 4). Any taxes or contributions not paid directly by the wage earner or benefit recipient are not included in gross incomes (and not deducted to arrive at net incomes). Thus, cross-country comparisons do not capture differences in social security contributions paid by employers or benefit agencies except to the extent that they influence the AW average earnings measures (Section 6 below takes a closer look at the role employer contributions play in net replacement rate calculations). Housing costs, childcare costs and any other forms of “committed expenditure” are not deducted when computing net incomes.

All income measures relate to the current period and therefore do not take into account any longer-term effects of today's labour market status on future earnings, pension entitlements, (re-)qualification for unemployment insurance benefits, etc. To the extent that individuals are aware of these future income implications and take them into account when considering their labour market status, it would clearly be desirable to allow for them when considering work incentives. Yet, this is beyond the scope of the static modelling framework. For low-income groups who frequently face liquidity constraints, current incomes may, in any case, often be the more immediate concern.

All tax and benefit amounts shown in this publication are computed using the rules and regulation that were in force on 1 July of the relevant year (2005). Unless otherwise noted, the same day is used as reference for the description of tax-benefit instruments in

Chapter 1 as well as the individual country chapters (available on the Internet at www.oecd.org/els/social/workincentives).

Throughout this publication (and also in the summary tables at the end of the country chapters), taxes, benefits and net income values are determined for a particular month (e.g. the first month of unemployment benefit receipt) but shown on an *annualised* basis (i.e. multiplied by 12) unless otherwise noted. This approach has two implications. First, the annualised amounts of certain benefit values may exceed allowable annual maxima (e.g. unemployment benefits that are available for less than 12 months). Second, income taxes, which depend on annual incomes, are determined in relation to the *annualised* amounts (i.e. the values for the particular month of interest multiplied by 12). Assuming unchanged income during the entire year has the advantage of being straightforward and informative in a situation where benefits can be received for at least 12 months. In cases where benefits are taxable *and* durations are shorter than 12 months, it is necessary to make an assumption about income earned in the remaining months. Taxing annualised values is, in this case, seen to be most consistent with the aim of determining taxes and benefits for a particular month. In addition, it is likely to be a reasonably good approximation of how authorities determine income tax pre-payments that are deducted at source in the month when income is earned. In effect, taxing annualised monthly values is equivalent to dividing all annual income tax parameters by twelve and taxing monthly incomes.

Since the aim of the model calculations is to provide an illustration of the tax-benefit rules in a given year, any time-lags delaying (e.g. for administrative reasons) the assessment of claimants' entitlement or the payment of benefits are disregarded. All differences in the timing of benefits (e.g. whether they are paid in arrears or in advance) are ignored as well. For instance, where social assistance benefits payable in the current year depend on previous year's net income, they are, instead, computed based on the family's current income situation. Thus income instantaneously affects benefits, rather than affecting them after some period of time. Unemployment benefits often depend on previous gross earnings. In the model calculations, these benefits are computed in relation to a specific percentage of AW earnings using the AW value for the current (rather than the previous) year. Where previous net earnings are the basis for benefit entitlements, relevant taxes are computed using the current year's tax rules.

2. Assumptions about earnings

Gross earnings in-work are expressed as a percentage of earnings of the average worker (AW). There has been a major change in the definition from the benchmark of the average production worker (APW) to average worker (AW) since the last editions of *Benefits and Wages* (see Box A.1). Details of how the AW earnings are calculated in each country can be found in *Taxing Wages* (OECD, 2007). The broad guidelines are as follows:


- Earnings are calculated for industry sectors C to K of the International Standard Classification of all Economic Activities (ISIC Rev.3.1, United Nations, New York, 1989).
- Data relate to the average earnings for the country as a whole.
- The worker is an adult (male or female) worker in the covered industry sectors, including both manual and non-manual workers. Some countries are not able to provide averages that include supervisory and/or management employees.
- The worker is assumed to be fully employed during the year, although several countries are unable to separate and exclude part-time workers from the earnings figures (in most of these cases, full-time equivalent wages are reported).

- Annual earnings are calculated by referring to the average of hourly earnings in each week, month or quarter, weighted by the hours worked during each period, and multiplied by the average number of hours worked during the year, assuming that the worker is neither unemployed nor sick and including periods of paid vacation. A similar procedure is used to calculate overtime earnings.
- Earnings are assumed to include average amounts of overtime and regular cash supplements (Christmas bonuses, thirteenth month payments, vacation month payments). Regular annual bonuses are included where they do not take the form of dividend payments. Fringe benefits are excluded.

Three countries (Ireland, Korea and Turkey) are not yet able to move to the broadened AW definition. The average wage figures reported for these countries therefore still refer to manual workers in manufacturing (industry sector D). AW levels for 2005 are shown in Table A.1. Statutory Minimum wages are shown for those countries where they exist and information is available.

Table A.1. **AW earnings and statutory minimum wage**¹
In national currency²

	2005		
	AW	Minimum wage	Minimum wage in % of AW
Australia	51 169	24 378	48
Austria	35 128	0	–
Belgium	36 468	14 640	40
Canada	39 816	15 184	38
Czech Republic	220 461	89 648	41
Denmark	320 300	0	–
Finland	32 671	0	–
France	30 509	14 232	47
Germany	41 691	0	–
Greece	20 521	8 100	39
Hungary	1 818 360	684 000	38
Iceland	2 958 000	0	–
Ireland ³	28 994	15 454	53
Italy	22 662	0	–
Japan	4 964 206	1 383 200	28
Korea ³	28 840 608	7 105 440	25
Luxembourg	42 135	17 712	42
Netherlands	38 671	16 418	42
New Zealand	40 782	19 760	48
Norway	378 782	0	–
Poland	28 563	10 188	36
Portugal	13 397	5 246	39
Slovak Republic	216 179	79 040	37
Spain	20 439	7 140	35
Sweden	316 602	0	–
Switzerland	71 638	0	–
Turkey ³	15 737	4 235	27
United Kingdom	29 364	10 296	35
United States	31 096	10 712	34

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1. All amounts are shown on a full-time basis (assuming 40 weekly working hours in countries where hourly minimum wages apply).
2. Euro for euro area countries.
3. AW value is not available. Figures refer to APW.

Source: OECD Tax-Benefit Models and Minimum Wage database (2005).

Box A.1. The impact of the change in earnings definition from APW to AW

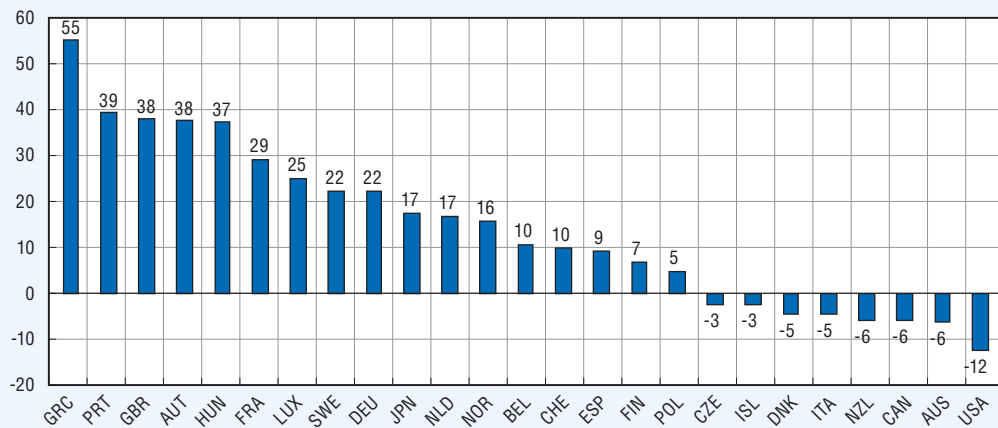
This edition – in line with the most recent editions of the OECD publications *Taxing Wages* (2007) and *Pensions at a Glance* (2007) – uses a new and more comprehensive measure of earnings corresponding to an “average worker” (AW) which broadens the previous benchmark of the “average manual production worker” (APW) in two important ways: i) it extends the coverage from industry sector D to industry sectors C to K (see Table A.1); ii) it includes both manual and non-manual workers.


Although implying a break in the time series for the base earnings measure and the corresponding indicators and results, the broadening of the OECD “average worker” concept is considered desirable and a major step towards increased cross-country comparability since average earnings of manual workers employed in the manufacturing sector has become increasingly less representative or “typical” over time.

While the coverage and thus representativeness has thus been extended, the concept and definition of earnings as described above remains the same. The earnings measure is gross wage earnings paid to average workers, measured before deductions of any kind (e.g. withholding tax, income tax, private or social security contributions and union dues).

The effect of moving to the new broader definition varies considerably amongst member countries. In a majority of countries, AW levels are higher than the average earnings levels under the previous APW definition (Figure A.1). In particular, the move to the new definition has implied a considerable increase of 37 or more per cent in gross wage earnings of the average worker for six countries (Austria, Greece, Hungary, Portugal and the United Kingdom). For four additional countries the increase in the gross wage earning was between 22 and 29% (France, Germany, Luxembourg and Sweden). For ten countries, the increase is between 5 and 17%. In contrast, this move has implied a sizeable decrease of 12% only in the United States and a more modest decrease in seven additional countries.

Figure A.1. Percentage difference of average earnings AW levels with regard to previous APW levels, 2005



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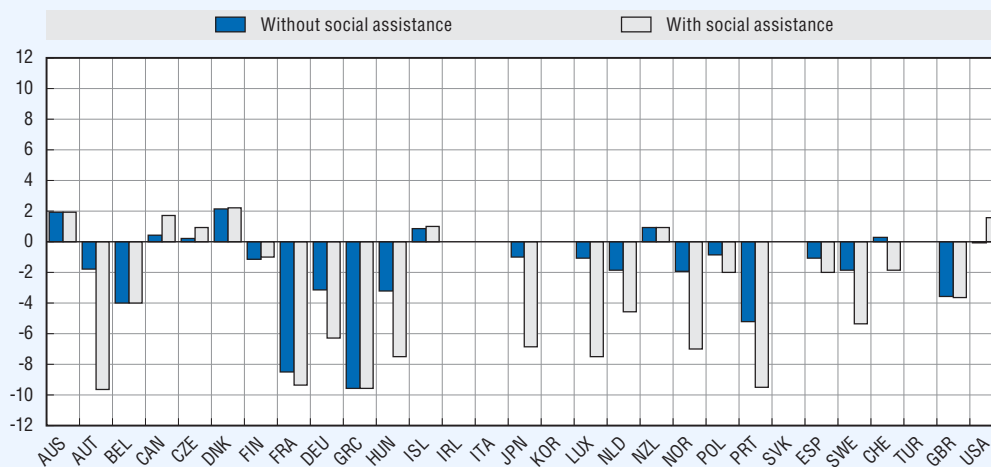
Source: OECD (2007), *Taxing Wages* 2005-2006, OECD, Paris.


Box A.1. The impact of the change in earnings definition from APW to AW (cont.)

For some countries, these are considerable differences. The earnings level based on the new definition may differ from that of an average production worker for three reasons: i) due to the broadening of the industry coverage from only manufacturing (ISIC D) to industries under ISIC Categories C to K inclusive; ii) due to the inclusion of non-manual workers; iii) due to use of a new data source. Unfortunately, the national data at hand do not allow to disentangle these three effects for a greater number of countries. However, OECD (2005a) suggests that the impact of the broadening of the industry coverage from D to C-K is *smaller* than the overall change, implying that the other two factors are the main drivers. At the same time, trend estimates seem to be affected much less by the move to the new definition (OECD, 2005b).

The move to the new AW concept also impacts on the indicators reported and discussed in this study such as net replacement rates and effective tax rates. For instance, in the case of flat-rate elements of social benefits, net replacement rates will *ceteris paribus* be lower when average earnings levels are higher. Indeed, Figure A.2 shows that the synthetic NRR measure discussed in Chapter 3 (Figure 3.3) is in general lower using the new definition where AW average earnings are higher than APW earnings, i.e. in the majority of countries. The difference is more pronounced when considering NRRs for persons and families entitled to social assistance. In some countries, the use of the new definition decreases the synthetic NRR measure by almost 10 percentage points (Austria, France, Greece and Portugal).

Figure A.2. Difference in synthetic NRR measure¹ when moving from APW to AW earnings basis, percentage points, 2005



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1. Unweighted average of net replacement rates over a period of 60 months, for four family types and two-earnings levels (see Table 3.2 in Chapter 3).

Source: OECD (2007a) and OECD Tax-Benefit Models.

Average effective tax rates tend to be lower using the new AW definition in a number of countries, too (Table A.2). This concerns in particular France, Hungary, Portugal and Sweden and differences are in general larger for AETRs for persons entering lower-wage employment. In some cases (Austria, lone parents in Luxembourg) the new AW definition can also lead to higher AETRs. These patterns need to be taken into account when comparing indicators based on the new AW earnings definition with results from previous publications.

Table A.2. Difference in AETR indicators when moving from APW to AW earnings basis, percentage points, 2005¹

	0 >> 1/2						0 >> 3/4						0 >> full-time					
	No children		Two children		Two children		No children		Two children		Two children		No children		No children		Two children	
	One-earner married couple	Two-earner married couple	Lone parent	One-earner married couple	Two-earner married couple	One-earner married couple	Single person	One-earner married couple	Two-earner married couple	Lone parent	One-earner married couple	Two-earner married couple	Single person	One-earner married couple	Two-earner married couple	Lone parent	One-earner married couple	Two-earner married couple
Australia	-1	-2	0	-2	0	-1	2	1	0	2	1	0	2	1	0	0	1	0
Austria	13	13	14	6	6	20	8	26	9	17	19	9	5	3	8	2	1	10
Belgium	1	1	1	2	1	1	-3	-3	-1	-2	-3	-1	-3	-3	-2	-2	-1	-1
Canada	-2	-2	-2	-3	-2	-1	-1	-1	-1	-2	-2	0	3	3	4	2	2	4
Czech Republic	-1	0	0	0	0	-2	0	0	0	0	0	-1	0	0	0	0	0	0
Denmark	2	2	2	3	3	2	2	2	2	2	2	2	1	2	2	2	2	2
Finland	0	6	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
France	-12	-10	-10	-25	-25	-11	-3	0	-2	-11	-10	-1	-6	-4	-5	-12	-12	-4
Germany	5	5	12	-2	4	11	1	-4	1	2	-6	1	1	-1	1	-3	0	1
Greece	12	12	0	16	16	0	-9	-9	0	-12	-12	0	-22	-22	-15	-25	-25	-15
Hungary	-24	-30	-30	-30	-30	-25	-16	-12	-16	-6	-20	-12	-10	-8	-10	-3	-3	-4
Iceland	1	1	1	1	1	1	1	2	1	1	2	1	1	0	1	1	0	1
Ireland ²	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Italy	1	4	2	2	2	5	0	1	0	1	1	1	0	1	0	-1	-1	2
Japan	1	0	1	0	0	1	0	1	0	1	0	0	-5	-5	-6	-5	-5	-2
Korea ²	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Luxembourg	9	9	8	20	8	8	6	6	5	13	6	5	4	4	4	10	4	4
Netherlands	1	-4	2	-1	-1	2	0	-3	1	-2	-2	1	-6	-11	-6	-10	-12	-6
New Zealand	-1	-1	12	-2	-1	10	1	-1	8	-2	-2	9	1	-3	6	-8	-5	8
Norway	-2	-2	-2	-1	-2	-2	-2	-2	-2	-1	-2	-2	-2	-2	-2	-3	-2	-2
Poland	3	2	2	2	2	2	-2	-2	-2	-2	-2	-2	-1	-1	-1	-3	-1	-1
Portugal	0	0	3	-28	-28	1	2	0	3	-19	-19	5	3	3	3	-11	-11	7
Slovak Republic ³	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Spain	-4	-4	-4	0	0	1	-4	-4	-4	1	0	1	-4	-4	-4	1	0	1
Sweden	-9	-9	-9	-6	-3	-9	-9	-9	-9	-6	-5	-9	-9	-9	-9	-6	-6	-9
Switzerland	1	-2	1	0	-2	1	1	3	1	0	-1	0	0	-1	1	5	-1	0
Turkey	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
United Kingdom	-1	3	-4	6	7	-17	-1	2	-3	9	10	-24	-2	-2	-2	6	7	-18
United States	0	0	0	-7	-7	0	0	0	0	-4	-4	0	0	0	0	-7	-6	-1

StatLink  <http://dx.doi.org/10.1787/141830626457>

1. AETR (average effective tax rate) for short-term unemployed persons re-entering employment. Further definitions: see note to Table 3.5.

2. AW value is not available.

3. APW value is not available.

Source: OECD Tax-Benefit Models.

3. Benefit assumptions

a) Benefits included

Benefits included in the calculations exclude benefits “in kind”. Hence free school meals, subsidised transport, free health care, etc. are not included. Occasional, irregular or seasonal payments (e.g. for Christmas or cold weather) are not included. Also excluded are benefits strictly related to the purchase of particular goods and services (other than housing or childcare as described below), reduced price transport or purchase of domestic fuel or the purchase of medical insurance and prescriptions. An exception is made for food stamps in the United States, as these are considered to correspond closely to social assistance cash benefits paid in other countries.

Cash benefits considered include unemployment insurance, unemployment assistance, social assistance, family benefits and lone-parent benefits, housing benefits, child-raising allowance paid to parents assuming childcare responsibilities for their own children and employment-conditional (or “in-work”) benefits. Benefits which are therefore excluded are, amongst others, old-age cash benefits, early retirement benefits, childcare benefits for parents with children in externally provided childcare, sickness, invalidity and occupational injury benefits and benefits relating to active labour market policies. Also excluded are payments made to those unemployed as a result of collective dismissal, such as the *Cassa Integrazione Generale* (CIG) and mobility benefits in Italy. Severance pay, even where legally required of employers, is not included.

b) Unemployment insurance

Unemployment insurance entitlement can be considered in three parts: the conditions for being entitled to benefit; the amount of benefit to which a person is entitled; and the length of benefit duration.

The standard assumption is that the benefit recipient is 40 years old and has been continuously full-time employed and contributing to the unemployment insurance fund since the age of 18. This means that in most countries the individual has a full contributions record in the period before unemployment; that where insurance is voluntary (as in some Nordic countries), the individual considered has contributed to the fund; and that the individual falls into the “standard” unemployment insurance system (older workers are often eligible for a longer duration of benefit receipt). The assumption means that in virtually every case the individual is entitled to unemployment insurance, where such insurance exists.

The amount of insurance benefit is often based on previous earnings. The level of previous earnings is defined with reference to the AW level of earnings in the current year. It is assumed that the stated proportion of this level of earnings has been earned over whatever period upon which assessment for benefit is calculated. Where minimum or maximum levels of benefit are included in benefit regulations, these are applied. The individual is generally assumed to be fully unemployed but special rules for part-time work during unemployment are applied if relevant to the calculations.* If supplements are paid reflecting the family situation of the unemployed person (e.g. for dependent spouses or

* Some of the “budget constraint” graphs (described in Chapter 2 and available on the Internet at www.oecd.org/els/social/workincentives) show the income consequences of part-time work for a recipient of unemployment benefits.

children), these are included. Benefits are sometimes reduced after a period of receipt. The reductions may be related to age and/or contributions record. Such reductions are applied as appropriate, using the assumptions about age and contributions record given in the previous paragraph.

For the calculations of replacement rates over a five-year period, the individual is assumed to receive the benefit for the length to which he or she is legally entitled. This implies that the individual satisfies whatever requirements for actively seeking work are imposed throughout the period of legal entitlement. In some countries there is a right to enter an active labour market programme (training, subsidised employment, etc.) after a certain period of unemployment. The individual is assumed not to participate in such schemes. Hence, even where participation in such schemes can requalify an individual for an insurance benefit and benefit receipt is in effect indefinite, the individual is assumed to exhaust benefit according to the *de jure* rather than the *de facto* duration of benefit receipt. Special rules for temporary layoffs are not included.

c) Unemployment-related means-tested benefits

This section considers the assumptions made where cash benefits are means-tested, particularly for unemployment assistance and social assistance.

Means-tested benefits are usually paid only when the assets of a family are less than a certain level, and are reduced as the income of the individual or family increases. The exact details of how these two features apply in each country vary greatly. Furthermore, social assistance benefits are often discretionary and the level is decided locally. Hence, eligibility assumptions can have a great effect on the benefit income which those out of work are indicated as receiving. The general assumptions applied are the following:

- Entitlement to means-tested unemployment assistance and labour market support programmes may depend on age and employment and/or contributions record. Where this is the case, the assumptions outlined in the section on unemployment insurance are applied. Similarly, job-search activity and duration of benefit are as described in that section.
- Social assistance may only be paid where all other sources of support have been exhausted. In certain cases this means the extended family has a legal duty to support those without resources. It is assumed that no such support is forthcoming.
- The assets of a family must often be below some level for there to be entitlement to benefit. The assets ceiling may be relatively high (several hundred thousand dollars, excluding the value of housing in Australia) or very low (often requiring sale of housing and even of cars). For calculations where social assistance amounts are explicitly included (see notes to the tables and figures), it is everywhere assumed that the family possesses negligible assets, and qualifies for the benefit subject to relevant income and other eligibility conditions.
- Benefits are reduced as family or individual income increases. Hence families with other sources of income (capital, alimony) may get reduced means-tested benefits. It is everywhere assumed that the family has no sources of income other than from benefits and/or employment.
- Social assistance in some countries may impose conditions on the behaviour of spouses. For example, in Sweden it is necessary for both spouses to be searching for work for entitlement conditions for social assistance to be satisfied. In Australia, each spouse has

an individual entitlement to benefit, with individual activity requirements required. In these cases, it is assumed that both spouses are fulfilling all requirements for full social assistance benefits to be received.

- Social assistance often varies according to local guidelines, the individual needs of families, and discretion given to benefit officers. Where benefit amounts have been set in national regulations, these have been used. Even where there is local discretion, there are often national guidelines. These guidelines have been used where available. In other cases, “typical” rates for each family type have been used. The full listing of social assistance amounts, and whether they are based on national rates, national guidelines or typical regional rates, are given in Table 1.3 of Chapter 1.
- Social assistance may be used to “top up” other income sources, including earnings and insurance benefits, where these are below the level of social assistance. For countries where relevant information has been received, this has been indicated in Table 1.3 of Chapter 1.
- In some countries the means-test is reduced in amount or removed altogether for payments made to beneficiaries participating in active labour market policies. Such schemes are not considered.

d) Housing benefits

Housing benefits are included where they consist of a cash benefit paid to individuals with low incomes or who are unemployed and who are living in private rented accommodation. Housing benefit may consist of a general means-tested benefit which supplements other benefits, or it may consist of special rules concerning the treatment of housing costs in the calculation of social assistance levels, or there may be the two types of system running in parallel. In the United Kingdom, Council Tax Benefit (available in Great Britain only) is excluded (as is Council Tax).

Subsidies for the construction of housing, purchases of owner-occupied housing, subsidies for the interest payments on owner-occupied housing, and other similar payments are not included. Similarly, the assumption of living in private rental accommodation means the benefits in kind provided by social housing, usually involving rents below the market rate, are not taken into account in the comparative tables.

Housing benefits are often very complex. A very simple assumption has been applied in this study, which has to be taken into account when interpreting the results. It is that housing costs consist entirely of rent, and the level of rent for all family types regardless of income level and income source is 20% of the gross earnings of an average worker. Where size is relevant, it is assumed to be 70 square meters. (Country specific assumptions, where required, are indicated in the country chapters available on the Internet.)

This implies:

- Single persons are assumed to pay the same rent as a couple with two children.
- Special rules (*e.g.* social assistance for non-rent-related housing costs, such as water and electricity) are not explicitly covered.
- A household living on social assistance is assumed to be paying the same rent as a similar household with average or above-average earnings.

- A household does not adjust its housing consumption according to income level, an assumption which is valid for the short-term unemployed, but less so for those households which have been without work for an extended period.

The 20% of AW used approximates the average level of housing consumption across the OECD. In some countries, however, housing costs can differ from this level, sometimes by substantial amounts. Furthermore, actual households without work will presumably on average spend less than this amount (reflecting their recognition of lower long-term consumption possibilities than more employable households, and also the effects of regional concentrations of unemployment on housing costs), and households with work will (again, on average) spend more. The housing cost assumption may not therefore reflect the typical housing costs of those living on benefit income in each country. It is justified on the grounds that, first, no practical alternatives are obviously preferable, and second, that it is transparent and easily understood. Any assumption other than fixed housing costs for those in-work and out-of-work would make interpretation of replacement rates difficult.

Where housing benefits vary by area, a typical rate has been chosen. Assumptions concerning means-testing are as in sub-section c above.

e) Family benefits

Family benefits may be unrelated to the incomes of the family or means-tested. Where they are means-tested, the assumptions given in the previous section are applied. Benefit amounts are often related to the age of the child; the tables in Chapters 2 and 3 and the country tables available on the Internet are based on the assumption of two children aged four and six. Where different assumptions have been made, the number of children and the amounts relevant for the ages are given in the footnotes to the tables.

f) Childcare benefits

All results assume that no childcare services are used and families are therefore not entitled to any benefits or tax reductions that depend on certain levels of childcare expenditures or on utilising certain types of childcare services. However, any benefits or tax reductions that are not subject to these conditions are assumed to be available as long as other relevant criteria are met (*e.g.* children's ages, family income). Childcare benefits paid to parents looking after their children at home (child-raising allowances) are also available subject to relevant conditions (*e.g.* number of working hours).

g) Lone-parent benefits

It is assumed that lone parents do not receive any alimony. Where receipt of benefit depends in part on co-operation with official attempts to identify the absent parent, it is assumed that such co-operation has been forthcoming. No other special transfers (*e.g.* widow's pensions) are assumed to be received, except for the benefits considered in this publication. Any means-tests are applied following the guidelines in sub-section c above.

h) Employment-conditional benefits

Employment-conditional (or in-work) benefits may be paid via either the tax administrative system (as in New Zealand, the United Kingdom and the United States) or that of the benefit system (as in Ireland). Both types of payment are considered benefits for the purpose of this report. Such benefits are paid only to those with earnings or those who

have worked more than a certain number of hours per week. They do not therefore affect incomes of those families out of work. They do affect the incomes of those working part-time, however, and the assumptions about hours worked and incomes earned determine the level of employment-conditional benefits. Delays in payment of benefit (which are often long – most recipients in the United States receive the payment in arrears at year-end) are ignored, with benefit income being calculated as it accrues. Means-testing provisions have been applied following the principles given in sub-section c. Some in-work benefits are only available following a recent transition into employment. Where this is the case, these conditions are taken into account in calculating net incomes so that benefits are only available if a transition into employment is assumed to have taken place.

4. Assumptions about taxation

This section gives a brief discussion of the assumptions used in calculating the tax due on earnings and benefits. The calculations of tax payments are based on the models used for *Taxing Wages* (OECD, 2005). These have been modified or extended where different or additional tax rules apply to the unemployed, to benefit recipients or to people earning income below 67% of AW.

Only personal income tax and employees' social security contributions payable in respect of earnings and benefits are included. Social security contributions made to the private sector are excluded, except when required by law (as in Finland or Iceland). Central, state and local government income taxes are included. Council tax in the United Kingdom is excluded.

Only standard tax reliefs are included when calculating tax payments. These are reliefs unrelated to actual expenditures incurred by the taxpayer and are automatically available to taxpayers who satisfy the eligibility rules specified in legislation. Typical standard reliefs include the basic reliefs available to all taxpayers, or wage earners, or benefit recipients, irrespective of family status; standard reliefs available to taxpayers depending on their marital status; standard reliefs granted to families with children (where relevant); and the standard relief relating to work-related expenses.

Non-standard reliefs are not included. Non-standard reliefs include those relating to costs of owner-occupied housing, relief for interest on qualifying loans, insurance premiums, contributions to savings' or pension plans, purchase of medical insurance, and charitable donations. An exclusion to this rule occurs when non-standard reliefs contain a "minimum benefit" clause, i.e. when the benefit is equal to the larger of some fixed amount or actual expenses. In these cases the benefit is taken as the fixed amount.

5. Treatment of regional differences

Several of the assumptions given above refer to how regional differences in tax and benefit systems have been taken into account. The broad principles are as follows:

- Where regional variations consist of deviations from general national guidelines which would otherwise apply, these are not taken into account. Hence, for example, extensions of unemployment benefit duration in high unemployment provinces and states in Canada and the United States are not considered.
- Where regional variations arise as a result of regional or local autonomy in setting regulations, three alternatives could be applied: the average of the different local

regimes, the regime applying in a particular region which can be considered typical, or national “guideline” rules.

Eight countries have regionally varying tax systems (two others – Japan and Norway – have local income taxes which do not, however, vary). In Denmark, Finland, Iceland and Sweden it is possible to calculate a weighted average of the single rate which applies in each area to a tax base which does not differ significantly from that of the central government tax system. This is used in the calculations of in-work and out-of-work net incomes. In Belgium, Canada, Switzerland and the United States calculation of such an average rate is not possible. Typical rates are used instead; the maximum permitted rate for Belgium, and the rates applying in Zurich (Canton and Commune) for Switzerland and the rates applying in the state of Michigan for the United States and the province of Ontario in Canada.

Information making it possible to calculate country-wide average benefit payments is not available to the same degree, and typical cases are more commonly used. Variations in rates are typically found for social assistance and housing benefits. Where typical rates are used for the tax calculations, the benefit system in that region has been followed for consistency. Note that the assumptions about housing costs mean that variations in housing costs across different regions are ignored.

6. Work-incentive indicators

a) Marginal effective tax rate (METR)

An indicator that can be used for measuring the extent to which taxes and benefits reduce the financial gain from work is the marginal effective tax rate (METR). This indicator measures what part of any additional earnings is “taxed away” through the combined effect of increasing tax and decreasing benefit. In other words, the METR measures the effective tax burden to which the additional earnings are subject to. Formally, we have:

$$METR = 1 - \frac{\Delta y_{net}}{\Delta y_{gross}} \quad [A1a]$$

Where Δy_{gross} are the “additional earnings” referred to above and Δy_{net} is the change in net income obtained after taxes and benefits so that the change in gross earnings between labour market states A and B is:

$$\Delta y_{gross} = y_{grossB} - y_{grossA} \quad [A1b]$$

and the change in net income is:

$$\Delta y_{net} = y_{netB} - y_{netA} = (y_{grossB} - t_B + b_B) - (y_{grossA} - t_A + b_A) \quad [A1c]$$

where t denotes total taxes and b denotes total benefits.

The earnings change Δy_{gross} can relate to a large or small change of working hours and/or hourly wages. In Chapter 3 (Section 2), METRs are calculated for a range of working hours transitions for somebody already in employment.

b) Average effective tax rate (AETR)

In addition, this same type of indicator can also be used to analyse the income consequences of transitions between employment and non-employment, in which case the change is equal to total earnings. In order to keep the notation consistent with previous editions of this publication, the METR for a transition into work is called AETR since it relates to a discrete transition between non-employment and employment rather than a

“marginal” income change. Its definition is equivalent to [A1] with labour market state B being “in work” (IW) and labour market state A being “out of work” (OW):

$$AETR = 1 - \frac{\Delta y_{net}}{\Delta y_{gross}} = 1 - \frac{y_{netIW} - y_{netOW}}{y_{grossIW} - y_{grossOW}} \quad [A2]$$

Other studies have referred to the AETR as “Unemployment Trap” ($METR_{UT}$) indicator for transitions from unemployment to employment and as “Inactivity Trap” ($METR_{IT}$) indicator for a transition into work from inactivity without unemployment benefits (Carone *et al.*, 2004), and also as “Participation Tax Rate” (Immervoll *et al.*, 2004) or “Tax-Benefit to Earnings Ratio” (Immervoll and O’Donoghue, 2003). The AETR should not be confused with the effective tax burden or “tax wedge”, which is often shown as a percentage of gross earnings for a particular employee and does not relate to transitions between different work situations.

c) Net replacement rate (NRR)

The other measure used in this publication to analyse the effects of labour market transitions on household incomes is the net replacement rate (NRR), usually defined as the ratio of net income while out of work divided by net income while in work:

$$NRR = \frac{y_{netOW}}{y_{netIW}} \quad [A3]$$

The NRR measures the fraction of net income in work that is maintained when becoming unemployed.

d) Relationship between AETR and NRR

Throughout this publication, all incomes y are assessed at the household level with one person changing between status A and B (or OW and IW) while the work status and earnings of all other household members remain unchanged. In the case of computing NRR for a two-earner couple, this means that the earnings of the partner whose earnings remain unchanged will, to a large extent drive the NRR results since these unchanged earnings appear in both the numerator and denominator of [A3]. While the degree of income maintenance as expressed by the NRR is a useful indicator regardless of the number of earners in the household, the AETR is a better indicator of the *influence of the tax-benefit system* on financial work incentives. It relates the change in net household income to the *change* in gross earnings and is therefore not directly affected by the level of any earnings received by other household members.

For an unemployed person who is single or lives in a household where nobody else has any income from work, there is a straightforward relationship between the AETR and the NRR: for those with high NRRs, net incomes during unemployment are not much lower than during employment. When moving back into work, they will thus tend to see only small increases in net income and, hence, have high AETRs as well. This direct link between NRR and AETR is most easily seen in the case of $NRR=AETR=1$ (in general, $NRR \neq AETR$).

To show the relationship between NRR and AETR formally, one can combine [A3] with [A2] and rearrange to obtain:

$$NRR = 1 - \frac{\Delta y_{gross} (1 - AETR)}{y_{netIW}} \quad [A4]$$

For a transition into work, the numerator of [A4] is the part of in-work earnings that is not “taxed away” (and is thus equal to Δy_{net}).

e) Employers’ social security contributions and comparability of indicators across countries

Social security contributions paid by employers (SSC_{er}) can be substantial and the relative importance of taxes and contributions paid by employers and employees differs markedly across countries (see OECD, 2007a). Since SSC_{er} are not considered in the calculations presented here, it is therefore useful to consider how they might affect the comparability of results. A first consideration is whether the insurance value or any future benefits bought by social security contributions should be taken into account in the calculations. As explained above, while taking into account future income streams may be desirable, the static modelling employed for the present analysis considers current incomes only. A second, and separate, issue concerns the incidence of social security contributions (see OECD, 1990, Chapter 6). To the extent that SSC_{er} reduce wages, they might usefully be considered a tax on employees. Similarly, any part of employee contributions that is incident on the employer may not be considered as reducing employees’ take-home pay. However, any “forward” or “backward” shifting of contribution payments will take place via adjustments to contractual wages. If APW values are measured in an equilibrium situation where these adjustments have taken place, then any wage adjustments will already be reflected in the average wage figures used as the basis for the calculations. Given the concern with current cash incomes (and, in particular, take-home pay in the case of employed persons), it is therefore appropriate to fully deduct employee contributions when computing net incomes. Similarly, any parts of SSC_{er} that may be incident on employees should not be deducted (since these will already be reflected in lower APW values).

The relevant mechanisms can be illustrated as follows. To the extent that contributions are incident on employees, higher employer SSC_{er} will, other things being equal, result in lower contractual wages. What does this mean in terms of the measurement of financial work incentives using the current cash income concept as in this publication? If SSC_{er} are raised from zero to X and a fraction of $0 \leq s \leq 1$ of X is shifted to employees, then average wages w will, by definition, decrease by sX . Once this adjustment process is complete, the NRR for a single person earning the average wage might be $b / ((1-t)(w-sX))$, where b is the net unemployment benefit, t is the individual’s average tax rate while in work and w is the average wage prior to the SSC_{er} increase. This is the same NRR one would obtain if, instead of raising X through employer contributions, employees would pay contributions of X : they would only end up paying sX with the remainder of X shifted to employers. It is clear, therefore, that once any forward or backward shifting of contributions is complete, the current cash income concept results in the same NRR measures regardless of whether contributions are paid by employees or employers. By virtue of [A4], this also holds for the AETR and METR measures. Subject to the assumption that the shifting processes are complete, the work incentive indicators presented in this publication are therefore comparable across countries with different levels of employer and employee contributions. It is nonetheless important to keep in mind that they are based on current income concepts and therefore do not take into account country differences in the rights to future incomes or services bought by social security contributions.

7. Family situations used as the basis for tax-benefit calculations

The use of “typical” households allows many of the determinants of tax and benefit amounts to be held constant while changing one household characteristic (*e.g.* the number of children) at a time. A focus on one aspect at a time helps improve our understanding of existing policy instruments as well as the differences between them across countries and at different points in time. These types of result thus provide a useful complement to population-based approaches such as incidence studies based on micro-data alone or microsimulation models capable of simulating the effects of fiscal and social policy instruments on a sample of actual households.

Computing tax and benefit amounts using existing policy rules illustrates the features of these instruments. And by repeating these calculations for a number of different household situations, they permit an assessment of the circumstances (*e.g.* family situation or income level) for which each of these features becomes relevant.

Taxes, benefits and net incomes are computed for a set of different family types:

1. Single adult without children, (employed/unemployed).
2. Lone parent with two children, (employed/unemployed).
3. One-earner married couple, (first spouse employed/unemployed, second spouse “inactive”).
4. One-earner married couple with two children, (first spouse employed/unemployed, second spouse “inactive”).
5. Two-earner married couple, (first spouse employed/unemployed, second spouse full-time employed).
6. Two-earner married couple with two children, (first spouse employed/unemployed, second spouse full-time employed).

The standard assumption is that adults are 40 years old and children are aged four and six. The age assumption for adults allows cross-country comparisons of maximum amounts of unemployment benefits, which may depend on age or contribution records (see Section 2b above). For each of these family types, net incomes are determined for a range of different earnings levels and/or working hours. The resulting indicators therefore cover a large number of family, labour market and income situations and provide a broad picture of how taxes and transfers potentially affect the incomes of different population sub-groups.

Yet, typical cases can never be fully representative of the actual situation in a particular country. This point is particularly relevant when comparing results across countries as certain family situations (such as lone-parenthood or two-earner families) may be much more common in one country than in others. Similarly, the earnings distribution will differ so that various percentages of AW will be more or less common across countries and for different family types (a study of the representativeness of the APW was carried out in OECD, 1999a).

8. Comparing with earlier results

The results in this publication are not strictly comparable with those reported in earlier editions of Benefits and Wages (OECD, 2002 and 2004). This is first due to the change in the average wage benchmark from average production worker (APW) to average worker (AW) (see Box A.1 above). Second, for some countries, calculation models for some or all

years between 2001 and 2005 have been revised in line with clarifications received from country experts. Therefore, the reader interested in comparisons over time is advised to refer to the series made available on the Internet (www.oecd.org/els/social/workincentives).

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